LABORATORIES

of Seattle,

Incorporated

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to:

Alaskan Copper Works

April

Report on:

Effluent P.O. NO. 8955

Lab. No.

E 18925

IDENTIFICATION:

Sample #1

Nitric Acid Bath

Sample #2

Oakite Tank Solution

ANALYSIS:

 1
 2

 Chromium, Cr, PPM
 3192
 6.1

 Nickel, Ni, PPM
 2670
 5.8

 Copper, Cu, PPM
 316
 19.1

Clyde J./Ambacher

mw

LABORATORIES

of Seattle,

Incorporated

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to:

Alaskan Copper Works-Gary Bullard Date:

May 14, 1980

Report on:

Effluent, P.O. No. 8748

Lab. No. E 19165

IDENTIFICATION:

	Sample #1 - 5-2-80, Sample #2 - 5-5-80, Sample #3 - 5-6-80, Sample #4 - Holding 5-6-80, Sample #5 - Holding 5-6-80,	3 p.m. 2 p.m. Dam #1 2 p.m. Dam #2	ock Ply	euraliang Tankang	SEOIMENT
	ANALYSIS:	1 2	<u>R</u> 3	4	5
5.5	PH	9.5 7.8	11.1	11.0	10.2
6	Chromium, Cr, ppm	3.4 2.0	3.1	6.6	477
3	Copper, Cu, ppm	5.7 2.7	4.7	10.3	475
6	Nickel, Ni, ppm	4.8 3.7	3.8	8.1	415
3	Cadmium, Cd, ppm	Less Than Less Than	Less Than	Less Than	
		0.1 0.1	0.1	0.1	1.9
3	Lead, Pb, ppm	Less Than Less Than	Less Than		
		0.1 0.1	0.1	0.3	15
5	Zinc, Zn, ppm	0.4	0.3	0.6	1.5

Sam LeBarron

pl						•
Dute.	PH	cd C	r CU	NI	P6	ZN
2/28/80	12.5	-008 8.9	34 21.85	30.31	1.84	2,45
2/14/80	ع،8	.01 45.5	58 24,04	3 a 54	.64	1.05
7/16/79	4,4	11.51 80,	4 6.35	7.86	.36	•53

LABORATORIES

of Seattle,

Incorporated

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1:	330	r	1421	AVENUE SOUT	
				\	-
				\	
				Report to:	

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

	Report to: Alask	an Copper Wo	rks-Gary Bul	lard Date:	May 14, 1980	
	Report on: Efflu	ent, P.O. No	. 8748	Lab. No.	E 19165	
	IDENTIFICATION:			¥	\mathcal{A}	3
	Sample #1 - 5-2-80, Sample #2 - 5-5-80, Sample #3 - 5-6-80, Sample #4 - Holding 5-6-80,	3 p.m. 2 p.m. Dam #1		053	NZ JAZ	TYPOST TYPOST
	Sample #5 - Holding 5-6-80, ANALYSIS:	Dam #2		SELS SELS SELS SELS SELS SELS SELS SELS	21	Sepinal H
		1 `	2	3	4	<u>5</u>
5 4 3 3	PH Chromium, Cr, ppm Copper, Cu, ppm Nickel, Ni, ppm	9.5 3.4 5.7 4.8	7.8 2.0 2.7 3.7	11.1 3.1 4.7 3.8	11.0 6.6 10.3 8.1	10.2 477 475 415
3 3	Cadmium, Cd, ppm	Less Than 0.1	Less Than 0.1	Less Than 0.1	Less Than 0.1	1.9
	Lead, Pb, ppm	Less Than 0.1	Less Than	Less Than 0.1	0.3	15
5	Zinc, Zn, ppm	0.4	0.4	$\overset{0.3}{\mathcal{R}}$	0.6	1.5

pl.

March 18 1980



of Seattle,

Incorporated

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to:

Alaskan Copper Works-Gary Bullard

Date:

June 4, 1980 -

Report on:

Effluent, P.O. No. 8904 G-B

Lab. No.

E 19310

IDENTIFICATION:

Sample #1 - 5-7-80, 3:30 p.m. Sample #2 - 5-9-80, 4:00 p.m. Sample #3 - 5-14-80, 4:00 p.m. Sample #4 - 5-16-80, 4:00 p.m. Sample #5 - 5-21-80, 4:00 p.m. Sample #6 - 5-23-80, 4:00 p.m.

ANALYSIS:

		2	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
PH	7.6	9.4	6.7	7.5	8.7	8.0
Chromium, Cr, ppm	4.5	2.8	3.1	2.1	2.0	7.4
Copper, Cu, ppm	5.1	6.4	4.4	3.0	3.6	8.5
Nickel, Ni, ppm	6.4	4.8	4.5	2.6	3.4	7.8
Cadmium, Cd, ppm	Less Than I	ess Tha	n Less Tha	n Less Than	Less Than	Less Than
	0.1	0.1	0.1	0.1	0.1	0.1
Lead, Pb, ppm	0.4	0.5	0.4	0.2	0.1	0.2
Zinc, Zn, ppm	0.5	0.7	0.7	0.1	0.6	0.6

ρŢ

Sam LeBarron



LABORATORIES

of Seattle,

Incorporated

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to:

Alaskan Copper Works-Gary Bullard

Date:

June 16, 1980

Report on:

Effluent

Lab. No. E 19407

IDENTIFICATION:

Sample #1 - 5-3-80, 4:30 p.m., silt tank emptied, 11:00 a.m. Sample #2 - 5-28-80, 4:00 p.m., silt level 6" from top, #2 Dam Sample #3 - 6-4-80, 4:00 p.m.

Sample #4 - 6-6-80, 3:45 p.m. Sample #5 - 6-11-80, 3:00 p.m.

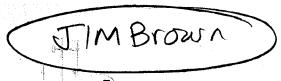
ANALYSIS:

	1	2	<u>3</u>	4	<u>5</u>
Chromium, Cr, ppm Copper, Cu, ppm	7.6 8.7	2.7	5.1 5.0	3.0 4.6	5.0 4.6
Nickel, Ni, ppm	8.6	1.9	10.0	4.7	6.8

Sam LeBarron

pΊ





LABORATORIES

of Seattle,

Incorporated

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

July 22, 1980

Report to:

Alaskan Copper Works - Gary Bullard

Report on:

Effluent - Analysis

Lab. No. E 19601

P.O. 9178 GB

IDENTIFICATION: Metro Sump Samples

3:30 p.m. pH 7.5 - Sample taken day after sump was cleaned 6-13-80

4:30 p.m. pH 10.5 6-18-80

pH 7.5 3) 6-20-80 3:30 p.m.

6-25-80 4:00 p.m.

pH 10 4:00 p.m. pH 10.5 6-27-80

6-30-80

3:45 p.m. pH 6 - 1 hour before Alum 9:45 a.m. pH 11 - 24 hr after Alum 7-2-80

7-3-80 4:00 p.m. pH 11

ANALYSIS:	1	2	<u>4</u> 5	<u>6</u>	Z	<u>8</u>
Chromium,	Cr. % 1	4 1.4	5.5 2.1 1	71.4	3.2	10.4
			6.4 2.9		- 44.4	ΩΩ
copper, cu	1, 6	. 3		Carried Commencer of the Commencer of th		3
Nickel, Ni	i, %	.7 2.0	7.1 2.5	1.9 58.2	2.4	8.5

pl



of Seattle,



Incorporated

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to:

Alaskan Copper Works

Date: 8-28-80

Report on:

Effluent

Lab. No.

E19854

IDENTIFICATION

Metro Sump Sampler

TEST RESULTS

1-8-8-80

3p.m., Ph9

2-

8-4-80 3:30p.m.,Ph10 Aluminum @ 4 weeks Dam #2

3-

7-2-80

2:30p.m., Ph10.5

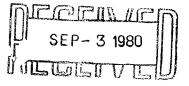
Aluminum @ 2 weeks Dam #2

Results -	Copper,ppm	Chromium, ppm	Nickel,ppm
Sample			
		32.7	50.4
2	9.0	3.2	3.2
3	12.1		6.5

Albert O. Wahto

jlf

CONFIDENTIAL REPORT - PUBLICATION RIGHTS RESERVED PENDING WRITTEN AUTHORIZATION



NORTHWE

LABORATORIES

of Seattle,

Incorporated

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to:

Alaskan Copper Works -

Date:

October 15, 1980

Report on:

Gary Bullard

Lab. No. E 20430

Metro Sump Samples - Analysis P. O. #9833G-B

SUBMITTED:

Metro Sump Samples

9-25-80 3:00 p.m. pH 10.5 9-29-80 3:00 p.m. pH 10 10-2-80 11:30 a.m. pH 9

Sample taken 10 min. after Neut. Cycle

10-10-80 1:30 p.m. pH 5

ANALYSIS:

Sample	Chromium, Cr,	ppm	Copper,	Cu, ppm	Nickel, Ni, %
	29 3		31.	3	ΔΔ Δ
					neve pair 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			6.	.0	1.7
	70.3		85.	.3	101.8
4	54.9		67.	.3	82.3

pΊ

0CT1 7 1980

Level 200 77. Es al montante de la companya de la c

LABORATORIES

of Seattle,

Incorporated

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to:

Alaskan Copper Works

Date:

October 22, 1980

Report on:

Effluent

Lab. No. E 20466

IDENTIFICATION:

Sample #1 10/14/80 #3200

2 10/15/80 3600

3 10/15/80 3200

4 10/16/80 3200

5 10/16/80 3600

5 10/17/80 3600

ANALYSIS:

Sample #	1	<u>2</u> <u>3</u>	4	<u>5</u>	<u>6</u>
Lead, Pb, PPM	1.3	0.8	1.2	0.5	4.0
Cadmium, Cd, PPM	<0.01	<0.01 <0.	01 < 0.01	< 0.01	< 0.01
Cyanide, Amenable, PPM	<0.1	<0.1 <0.	1 2.5	2.0	< 0.1

⁼ Less Than

Clyde J. Ambacher
Clyde J. Ambacher

pl

LABORATORIES

of Seattle,

Incorporated

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to:

Alaskan Copper Works

Date:

October 22, 1980

Report on:

Effluent

Lab. No. E 20466

IDENTIFICATION:

Sample #1 10/14/80 #3200

10/15/80 10/15/80 3600

3200

10/16/80 3200

10/16/80 3600

10/17/80 3600

ANALYSIS:

Sample #	1 2	<u>.</u>	4	5	<u>6</u>
Lead, Pb, PPM	1.3	.8 1.2	1.2	0.5	4.0
Cadmium, Cd, PPM	<0.01	<0.01 <0.	01 < 0.01	< 0.01	< 0.01
Cyanide, Amenable,	PPM < 0.1 <	(0.1 <0.	1 2.5	2.0	<0.1

< = Less Than

Elideli Ambacker
Clyde J. Ambacher

pl

of Seattle,



Incorporated

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to:

Alaskan Copper Works

Date: November 5, 1980

Report on:

Effluent

Lab. No. E 20563

IDENTIFICATION:

Sample	#1	Sampl	e rece	ived	10/28	3/80-3	200
	. 2	Sampl		n jag	10/28	3/80-3	600
	3	u.		11 🦫 🦈		7/80-3	
	4			Hii Assar	10/29	7/80-3	600
· · · · · · · · · · · · · · · · · · ·	5	() (i ii.	الخوري الول الاراد	Ù.	10/30	0/80-3	200
and the same	6	4				0/80-3	

ANALYSIS:

지진 그 그에면 가는 말씀하다는 그를 취하다는 모모라고	Section 1	and the second control of the second	A	(5.3) × 3/	<u>د</u>
Sample #	- Warner 1	3	4 J		U j
Sample #			·	Turate B 🗒	
		Section of the sectio	The second secon		31 3
The first of the state of the s	Section and a section of the commence of the section of the sectio	Section of the sectio	g Symptomic Greek (1985)	\$ \$ N. S.	7, 1
1 01 000	the second secon	the consequence of the stage	A construction of the second s	. No. 1991 - E.	3.2
Lead, Pb, PPM	2() 1 2()	1 40.1	86 20	1	n
	~0.1	·	U.U .U.	1.55 (200 to 100 to	• •
	7.4		The second second second	N 100 A 100	The Maria
그는 얼굴이 가장 없었다면 하다 하다 그를 다 없다면 하다 하다 하다.	The second second second second second	Table March 1980	I have a subsectify the	44,930 \$	¥.
Cadulation Od DDM	-0 01 0	^1		· •	
Cadmium, Cd, PPM	<u_u1 <u_<="" th=""><th>01 <0.01</th><th>((), () <(), (</th><th>11 < < ()</th><th>. () [</th></u_u1>	01 <0.01	((), () <(), (11 < < ()	. () [
[- 10 TWT] [1 TWELT # 20 TW [#6+4+4+4444	The section of the contract of	기 등 전에 기 기 등 등 등 등 등 등 등 등 등 등 등 등 등 등 등 등 등			• • •
그 그 그를 가는 그 걸었습니다. 그 분차 하는 사람이 없는 것이다.	학교 등 사람들이 되었다.	그 환경 그 그 사람들은 기업적인 그 그리고 없다면 그 그리고 없다면 그 그리고 있다.	40.000	Water 1	3 3 3
			The second of th	. 25"	1 1 7
Cyanide, Amenable, PP	M -0 00E -0	005 0 065	0.000	ງ1 ິ. ∩ິ	OOF
Cyaniue, Amenable, Pr	M 40.000 40.	UUO U.UOO	U.U00 UU.) L	ຸບບວ
The first transfer of the control of the		이 경험을 보고 이뻐 생활이다고요.	1555.J 1855.11877		7 (7 %)
THE RESERVE OF THE PROPERTY OF		TOTAL AND	The contract of the contract o	Salar Salar	\$ B.

= Less Than
PPM = Mg/Liter

js

Tyge J. Ambacher

MEMBER SINCE 1602

LABORATORIES

of Seattle,

Incorporated

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to:

Alaskan Copper Works

Date: November 5, 1980

Report on:

Effluent

Lab. No. E 20563

IDENTIFICATION:

Sample #1	Sample received	10/28/80-3200
. 2		10/28/80-3600
3		10/29/80-3200
4		10/29/80-3600
5		10/30/80-3200
6		10/30/80-3600

ANALYSIS:

Sample #		1. 1.	<u>2</u>	<u>3</u> 4	<u>5</u>	<u>6</u>
Lead, Pb	, PPM	۷۰.1	<0.1 ∠0	.1 8.	6 <0.1	1.0
Cadmium,	Cd, PPM	<0.01	<0.01 <0	.01 <0.	01 <0.0	<0.01
Cyanide,	Amenable, PF	M <0.005	<0.005 0	.065 0.	086 0 03	1 <0.005

< = Less Than
PPM = Mg/Liter</pre>

js

Plyds J. Ambacher
tryde J. Ambacher



of Seattle,

Incorporated

Technical Services for: Industry, Commerce, Legal Profession & Insurance Industry

1530 FIRST AVENUE SOUTH

SEATTLE, WASHINGTON 98134

Telephone: (206) 622-0680

Report to:

Alaskan Copper Works

Date:

November 11, 1980

Report on:

Effluent

E20627 Lab. No.

Submitted: Three samples of effluent

IDENTIFICATION:

Sediment sample 10-24-80, Sample "A" Sample "B" Rinse Tank sample 10-24-80, 3200 Acid Vat Sample 10-24-80, 3200 Sample "C"

ANALYSIS:

"A" Sample pН 9.9 Acid (as nitric acid), %

"B"

1.1

0.9

3.34

"C"

AND THE DAY DES